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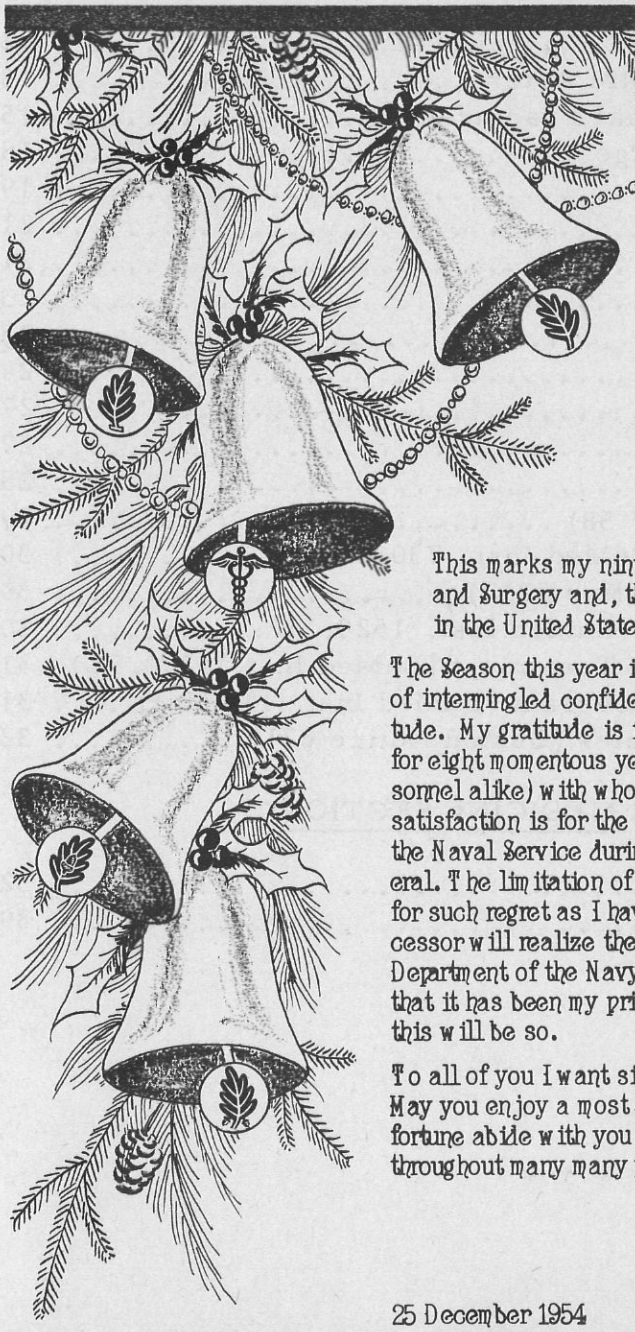
MEDICAL NEWS LETTER

Editor - Captain L. B. Marshall, MC, USN (RET)



Merry Christmas

To: All Hands, Medical
Department of the Navy

This marks my ninth consecutive Christmas in the Bureau of Medicine and Surgery and, therefore, a major milestone in my years of service in the United States Navy.

The Season this year is approached with a particular and peculiar sense of intermingled confidence, hope, regret, satisfaction, and profound gratitude. My gratitude is for the wonderfully faithful and able support I have for eight momentous years received from those (civilian and service personnel alike) with whom here I have had the good fortune to work. My satisfaction is for the accomplishments that have accrued to the good of the Naval Service during my incumbency as either Deputy or Surgeon General. The limitation of those accomplishments constitutes the major cause for such regret as I have. It is in any event devoutly hoped that my successor will realize the same full measure of effort in behalf of the Medical Department of the Navy upon the part of all who comprise that Department that it has been my privilege to realize, and I have every confidence that this will be so.

To all of you I want simply and sincerely to say, "Thank you so much". May you enjoy a most pleasant Christmas and may good health and good fortune abide with you all during the New Year which is at hand and throughout many many years to come.

LAMONT PUGH
Rear Admiral (MC)
Surgeon General, U. S. Navy

25 December 1954

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SPECIAL NOTICE

TO ALL ADDRESSEES (EXCEPT U. S. Navy and Naval Reserve personnel on ACTIVE DUTY and U. S. Navy Ships and Stations).

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Editor

(Detach here)

Chief, Bureau of Medicine and Surgery _____
Navy Department, Potomac Annex (date)
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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Notice

Due to the critical shortage of medical officers, the Chief, Bureau of Medicine and Surgery, has recommended, and the Chief of Naval Personnel has concurred, that Reserve medical officers now on active duty who desire to submit requests for extension of their active duty for a period of three months or more will be given favorable consideration.

* * * * * *

Residency Training Policy for Reserve Medical Officers on Active Duty

The response by Reserve medical officers to the Residency Training Program for Reserve officers, as provided in BuMed Instruction 1520. 7, has been most gratifying. There are several vacancies remaining in the following residency programs: Pathology, Orthopedic Surgery, Obstetrics and Gynecology, Pediatrics, and Urology. A very limited number of billets are still available in Otolaryngology, Anesthesiology, and Ophthalmology. While applications for training in the above specialties should be for one year at a time, it is expected that in most instances officers who participate in this program will be permitted to complete their required training without interruption. Every effort will be made to accomplish this insofar as service needs will permit.

Reserve medical officers on active or inactive duty, who have completed their obligated active duty imposed by the Universal Military Training and Service Act, as amended, are eligible for participation in this program. Reserve officers on inactive duty must request return to active duty in order to be assigned to such training.

Eligible and interested medical officers should make applications to the Bureau of Medicine and Surgery, via the chain of command. Letters of application should contain an agreement to volunteer for the period of residency training requested and to remain on active duty in the Navy for a period of one year following completion of training, for each year of training received.

From time to time the list of medical specialties in which shortages exist will be published in the Medical News Letter. (ProfDiv, BuMed)

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Therapeutic Use of Enzymes

Purified enzymes as therapeutic agents are in the early stages of development and evaluation. Their potentialities for treatment of many diseases and surgical conditions, and as adjuncts in treatment of many others, are great; they will have few harmful side effects if properly used. An understanding of the basic mechanism of action of the presently available materials must be established before they can be used in a logical manner with satisfactory results.

The principles of activation of enzymes, the activators available for each enzyme, and the inhibitors normally present or developed as a result of the disease being treated or of the treatment itself, must be understood and considered carefully in each case to be treated.

The enzymes, at present in clinically useful stages of development in a relatively pure form, fall into the groups of (1) proteolytic enzymes, and (2) the enzymes which depolymerize hyaluronic acid.

(1) The proteolytic enzymes presently available through drug channels include: (a) Trypsin, a crystalline enzyme, and (b) Streptokinase-Streptodornase (SK-SD), a mixed activator and enzyme product. The enzymes at present in an advanced developmental stage are: (a) plasminogen, the serum profibrinolysis, and (b) several collagenase-containing preparations. Chymotrypsin is a crystalline enzyme with which little clinical work has been done.

(2) Hyaluronidase is a commercially available, relatively pure enzyme which acts on the hyaluronic acid of the intercellular or ground substance.

Proteolytic Enzymes. There are at least three groups of proteolytic enzymes found in the body fluids or cells whose activities have been carefully evaluated. They are usually in an inactive state, and may be activated to clean up exudates of infections and wounds. Not all are effective under the same conditions.

The cathepsins are tissue proteolytic enzymes which are active in an acid medium (about pH 5). The use of acids such as pyruvic and phosphoric acids in debridement of burn eschars is based on this acid activation of the cathepsins.

The leukoproteases are enzymes produced by the leukocytes and large mononuclear cells, some of which are active at a slightly less acid pH, than the cathepsins and others in an alkaline medium (about pH 8).

Pepsinogens and peptidases are found in the serum but their importance has not been clarified.

The proteolytic enzyme system has been popularized for the so-called "enzymatic debridement" which functions at an approximately neutral pH.

Active study of this system goes back to the turn of the century when it was observed that blood contained a fibrinolytic material. Later it was found that streptococci which produce rapidly, spreading infections and liquid exudates, produced a material which resulted in the lysis of human clots and fibrin-bearing exudates. It was thought at first that this was due to a lytic material produced by the streptococci themselves, but ultimately it was shown that it was due to a profibrinolysin (plasminogen) present in the plasma which was activated by the streptokinase. It has since been shown that certain strains of streptococci produce not only this activator, but at least three other true enzymes, a streptolysin, an enzyme known as streptodornase which causes the depolymerization of desoxyribose nucleic acid, and a hyaluronidase.

If the wound to be debrided is a surface wound or burn, the solution SK-SD, trypsin, or plasmin may be sprayed on, or placed on the wound as a wet dressing. More recently, a water soluble base has been used to maintain contact for a prolonged time. If used in a deep, dirty wound, or in a cavity connected to the surface by a sinus, a catheter is usually first inserted into the depths of the wound and the material then injected so as to remain in contact for as long a time as possible. If used in a closed cavity, the enzyme may be injected through a needle as for a thoracentesis, or through a catheter used for drainage after aspiration has given assurance that the needle or catheter is in the cavity. Great care must be taken that the injection is not into the lung or directly into the blood stream because of the severe general reaction which might be produced with SK-SD or trypsin.

Two reviews of the clinical uses of hyaluronidase have been published previously. The first suggested clinical use of hyaluronidase was in hypodermoclysis, and this remains undoubtedly the most commonly accepted clinical use of this drug. It is particularly useful in infants where intravenous therapy is so difficult. The rapidity of absorption is increased almost to equal that of the safe spread of infusion in infants, with 250 to 300 cc. of solution given within 80 minutes, as compared with 150 to 180 minutes in the control. The danger of slough from pressure of unabsorbed fluids is prevented, and the area can be used again in a short time. In adults, it is particularly useful in those who have had long-drawn-out diseases with damage to veins from frequent infusions or thromboses. It has been observed that, with clysis with hyaluronidase in the subcutaneous tissue, the fluid absorption is increased 12-fold over the control, and that with glucose the

glucose curves almost equalled those with venous infusions, but was much less effective with the clysis into the muscle.

Where necessary, other fluids besides electrolytes and glucose may be given by clysis using hyaluronidase, without producing the serious symptomology, such as pain, which occurs without it. Plasma proteins have been shown to be absorbed 1-1/2 to 3 times as rapidly with the enzyme as in controls, and plasma has been shown to be absorbed almost as rapidly as nonprotein solutions. Protein hydrolysate with dextrose has been given by clysis with this method with good results.

A similar application of hyaluronidase is to enhance the absorption of medications, especially those which must be given in large quantities and which are painful when given subcutaneously.

The use of this enzyme in local anesthesia has many advantages including: less ballooning and distortion of tissues; an increase in diffusion of the anesthetic with a wider area of more complete anesthesia; and a more rapid induction with less agent required. In addition, there is usually less postoperative edema and ecchymosis. The disadvantages include a shorter duration of anesthesia and some increased toxicity especially with the more rapidly absorbed anesthetics, if the standard amounts of anesthesia are used.

The combination of procaine with hyaluronidase has been found to be useful in local anesthesia for reduction of fractures, in dental surgery, in tonsillectomy, and in nasal plastic surgery for rhinoplasty and submucous resection. Local anesthesia in ophthalmology has been made more satisfactory because of the decompressing effect, less ballooning of the tissues, and good general paralysis of the extra-ocular muscles with one injection. Mucosal absorption is increased in surface anesthesia and smaller amounts of anesthesia can be used, but one must beware of increased absorption with serious toxic reactions.

It is fair to say that when used in conjunction with good medical and surgical principles, including the use of antibiotics, these enzymes are a very useful addition. Streptokinase-Streptodornase is most useful in hemothorax, hematomas, in thick empyema and in abscesses, wounds, or ulcers containing plasminogen. Trypsin will be most useful in debriding early chronic abscesses, ulcers, and wounds, and for clearing the respiratory tract of thick secretions. Its use in thrombophlebitis and related conditions is still controversial. Hyaluronidase will increase the speed of absorption of clysis and drugs, the reabsorption of excess fluids and blood in the tissues, and the effectiveness of local anesthesia.

Many other suggested uses of these enzymes may prove to be satisfactory and new enzymes now in process of development may be found very useful, especially in treatment of burns (collagenases) and vascular thromboses (plasmin). (Am. J. Med. Sci., Nov., 1954; E. E. Cliffton, M. D., Cornell University Medical College, Ithaca, N. Y.)

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Pulmonary Edema

Pulmonary edema can be defined as the escape of serous fluid from the pulmonary capillaries into lung tissue, alveoli, bronchioles, and bronchi. Acute pulmonary edema as a complication of thoracic surgery is found with relative infrequence at the present time except in patients undergoing cardiac surgery. Patches of pulmonary edema are probably frequent in persons with atelectasis or pneumonia. Areas of pulmonary edema are found in nearly all necropsies.

The clinical picture of pulmonary edema will vary with the severity of the attack. Small, localized, edematous areas are commonly associated with atelectasis and infection in the lung. These areas will probably not be recognizable as pulmonary edema. Paroxysmal dyspnea may occur in patients with hypertension, coronary disease, or aortic valvular disease. This is acute pulmonary edema in its mildest form. A moderately severe form of pulmonary edema can be recognized as cardiac asthma. In this instance the edema is characterized by asthmatic type rales in the lungs. Heyer and Plotz have shown that there appears to be an associated bronchospasm with this clinical syndrome. The most severe form of edema is clinically recognized as acute pulmonary edema.

The onset of the edema may be gradual or sudden. The patient may complain of oppression or pain in the chest and will be apprehensive. There will be respiratory distress varying from dyspnea to orthopnea. The patient will cough up frothy and perhaps blood-tinged sputum in large amounts. He will be pale and sweaty. Moist rales will be present throughout the lungs. In less severe cases the pulse rate and the blood pressure will be increased, but in severe cases the blood pressure will be decreased. Figures are given to demonstrate the characteristic x-ray changes.

Acute pulmonary edema is a serious complication with a high mortality rate. The chief factors concerned in the production of pulmonary edema are: (1) increased capillary permeability usually due to anoxia; (2) increased hydrostatic pressure in pulmonary capillaries when the right side of the heart pumps more blood than the left side; (3) decreased osmotic pressure of the blood.

Small unrecognized patches of pulmonary edema are common. Paroxysmal dyspnea, cardiac asthma, and acute pulmonary edema are increasingly severe forms of pulmonary edema. Respiratory distress and copious watery, blood-tinged sputum are typical. The blood pressure will be elevated in less severe cases but decreased in severe cases.

Pulmonary edema should be prevented by avoiding anoxia, by preventing pulmonary capillary hypertension, and by maintaining normal osmotic pressures in the blood. To treat acute pulmonary edema, the head of the patient should be raised, positive pressure oxygen should be administered, phlebotomy should be done, and digitalis and morphine administered. (Dis. Chest, Nov., 1954; E. J. Beattie, Jr., Chicago, Ill.)

Sprue vs. Pancreatogenous Steatorrhea

The clinical and laboratory differentiation of the various causes of steatorrhea is often difficult. Recently, interest has been aroused in the possibility of distinguishing sprue from pancreatogenous steatorrhea by roentgen examination. Numerous reports on this subject have appeared in the past two decades.

The published experience of the last two decades reveals two leading causes for steatorrhea. These are sprue and pancreatic intestinal enzyme deficiency. Three basic classifications of steatorrhea are generally accepted: (1) Idiopathic, as seen in sprue and severe deficiency states; (2) Pancreatogenous, resulting from a deficiency of pancreatic intestinal enzyme. Intrinsic inflammatory or neoplastic disease, duct obstruction, and extirpative surgery are the chief causes; (3) Symptomatic, the result of obstruction of small bowel lacteals by neoplastic or inflammatory processes. This is a heterogeneous group, including amyloid disease, lymphoma, Whipple's disease, regional enteritis, and others.

This report is based upon small bowel studies in 19 cases of sprue, compared with studies in 10 cases of pancreatogenous steatorrhea. Two basic criteria were used in the selection of the sprue cases: (1) The patient must not have received specific anti-sprue therapy (liver or extensive multi-vitamin supplement) prior to the small bowel study analyzed, or (2) if such therapy has been given, it must not have been clinically effective. Liver therapy, as well recognized, can cause an abnormal small bowel pattern due to sprue to revert toward a normal pattern. The clinical follow-up and response to specific therapy in the 19 cases have been maintained for a sufficiently long period to confirm the diagnosis.

In 10 cases of pancreatogenous steatorrhea, the diagnosis was made by exploratory laparotomy in 7 cases and calcification of the pancreas in 3 cases.

The data as presented demonstrates conclusively that the small bowel patterns in sprue and pancreatogenous steatorrhea, considered as groups, differ materially. The small bowel pattern in pancreatogenous steatorrhea approaches or coincides with the "normal" pattern.

The small bowel pattern in active sprue, as a group, differs from that in pancreatogenous steatorrhea. With stated reservations, these differences may be used in the individual case as an aid in differentiating sprue from pancreatogenous steatorrhea. As a general axiom, the closer the small bowel pattern approaches the normal, the more likely it is that the steatorrhea is of pancreatogenous origin. (Radiology, Oct., 1954; A. T. Hornsby, M. D., and G. J. Baylin, M. D., School of Medicine, Duke University, Durham, N. C.)

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Black Fly Bites

A group of similar but unfamiliar eruptions were noted among soldiers and their dependents in Tokyo. Japanese personnel identified some of the lesions as "buyo bites," and these were subsequently identified as inflicted by a species of Simulium, or black flies.

The Simulium flies are blood-sucking insects, but the females (only) are vicious biters. Black flies are tiny insects (1 to 5 mm. long) with six blade-like piercing mouth parts in the female; the small body is hump-like, the antennae have 10 to 11 joints; a characteristic wing venation is useful in classification, and thick short legs are present. They breed in flowing streams or ditches where they cling to debris. In the summer the eggs hatch in 5 days; then larvae emerge and require 3 to 10 weeks for development before the brief pupal period of 3 to 6 days. When optimal conditions are met, the pupa forces its way out of its pupal case and, surrounded by a bubble of gas, rises to the surface of the water and flies immediately. Five to six generations may be produced each season.

The range of the insect is rather small, usually 1000 yards, but with a strong wind it may go one mile from its breeding place. Grassy golf courses and shady wooded areas are commonly populated by flies, but many of the bites occurred in a dependents' housing area in the suburbs of Tokyo. Most of the bites were inflicted around sunrise or sunset. The bites occurred most commonly after rain. Fortunately, the insect does not usually enter a house.

The bites seen in Japan were present mainly on the legs and arms (exposed areas). Among Japanese wearing wooden sandals, the back of the heel was bitten. Multiple bites are made possible because of the tiny size of the insect, its persistence, and the painlessness of the puncture. The fly will feed from 40 to 60 seconds if not disturbed. It is believed that the fly injects an anesthetic anticoagulant. For so small a fly, the hemorrhage is severe, and often the first warning is a trickle of blood. The normal course of the reaction is a small ecchymosis with a blood crust, followed in several hours with a small pruritic papule that persists several days and disappears without any residual lesion. Other persons develop erythema and large wheals that slowly enlarge to 1 cm. Occasionally, the tenderness and appearance resemble a bruise. Less commonly, a severe acute reaction is seen.

Some subacute cases have been noted with pruritic papules and wheals with central vesicles at the punctum. Pruritis is especially intense and excoriations keep lesions raw and retard healing. Satellite vesicles form around the central lesions forming large weeping patches with crusting. Healing occurs in 2 to 8 weeks with flat shiny cicatrix formed. Persistent lesions have been observed in nine patients. The duration of the lesions was 6 to 11 months. Two distinct reaction patterns have been observed, with some cases having features of both. The

commonest type has been corymbiform nodular vesicular patches with associated lesions indistinguishable from nummular eczema. The anterior lower legs have been most commonly involved, although the arms and the neck have been affected.

Hard, pigmented, rough, pruritic nodules characterized the other type. Unless scratched and secondarily infected, these remained relatively quiescent. The periphery of the lesions had a few vesicles and crusts, but frank exzematization rarely occurred. The Japanese have named this type "urticaria perstans verrucosa." Healing ultimately occurs with scarring and pigmentation.

Therapy of all stages of this disease is essentially palliative. Oral antihistamines, compresses (hot or cold), shake lotions, and elevation of the involved part are used during the acute stage; 3% iodochlorhydroxyquin with 40% pine tar in Lassar's paste is beneficial during the chronic phase, and x-rays are very effective in hastening the involution of indurated plaques and in relieving the itching. However, all chronic lesions may show exacerbations with nummular-type exzematization as long as any trace of the "mother lesions" remains.

Prevention is possible by using repellents like dimethylphthalate or newer chemical types now available. However, the repellent must cover all exposed areas, as the insects will bite untreated areas even if the repellent surrounds the spot. Sweating dilutes the repellents and makes them less effective. D. D. T. solution has been used to destroy the fly and also its larvae in breeding areas. (Arch. Dermat.& Syph., Nov., 1954; Major E. F. Gudgel and Colonel F. H. Grauer, MC USA)

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Carcinoma of the Lung

This report is based on a study of 403 patients with carcinoma of the lung seen at the Lahey Clinic during the past fifteen years. There were 350 males and 53 females, a ratio of 6. 6 to 1, although this ratio does not hold for all types of bronchogenic carcinoma.

Late diagnosis is the chief factor which accounts for poor end results. It is imperative to stress at every opportunity the importance of: (1) frequent and repeated roentgenologic surveys of the chest; (2) the follow-up of every abnormal shadow found; and (3) the follow-up of every thoracic symptom until it is explained. It is only in this way that operability will be increased and more cures result. Cases of bronchogenic carcinoma have been confused with almost every type of intra-thoracic and constitutional disease, notably unresolved pneumonia, virus pneumonia, tuberculosis, influenza, asthma, angina pectoris, diaphragmatic hernia, et cetera. As indicated, the symptomatology associated with cancer of the lung is pathetically nonspecific, and the common symptoms

of cough and chest pain are found in a number of intrathoracic diseases, many of which are innocent. The symptoms of cancer of the lung in 403 patients are listed.

It is to be emphasized that, although cough was present in a high percentage of cases, it was by no means constant. Furthermore, the widely publicized symptom of hemoptysis was present in less than one-half of the cases, and it was the chief symptom in less than 1 out of 5. The high incidence of weight loss and chest pain suggests the advanced state of the disease in many cases. This high percentage of inoperability is even more readily understandable when it is considered that over 25% of the patients had their chief symptoms for more than 1 year.

On completion of the history and physical examination, the diagnosis of cancer of the lung was made in 260 cases, or 64.5% of the total. Furthermore, metastases were indicated clinically in 105 patients, or 26%.

This statistical review of 403 carefully followed cases of carcinoma of the lung reveals: (1) The present-day therapy of carcinoma of the lung, while leaving much to be desired, yet clearly establishes the sound surgical basis for pulmonary resection. Thus, 9.5% of all cases and 37.8% of those given curative resection survived 5 years or longer, with a total resection mortality for all the years of 7.6%; (2) That emphasis must be placed increasingly on patient and practitioner awareness. Only in this way can the long interval between onset of symptoms and resection be shortened; (3) Further research is indicated before the etiological factors involved in the various types of cancer of the lung can be stated; (4) High-voltage radio-therapy may have something to offer as an adjunct to surgery in the treatment of bronchogenic carcinoma; (5) Those who have the opportunity should persistently strive to bring about more chest surveys with complete follow-through and careful attention to all intrathoracic symptoms until they are fully explained. (J. Thoracic Surg., Oct., 1954; D. P. Boyd, M. D., M. I. Smedal, M. D., H. B. Kirtland, Jr., M. D., G. E. Kelley, M. D., and J. G. Trump, D. Sc., Boston Mass.)

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Acute Occlusion of the Internal Carotid Artery

Acute spontaneous occlusion of the internal carotid artery, masquerading as stroke, multiple sclerosis, and other diseases, is probably much more common than has been generally supposed.

The etiology has been described in the literature as arising from an embolus, such as that thrown off by a mural thrombus and by thrombosis of the internal carotid artery. The thrombosis may be retrograde, for example, after ligation of other arteries. It may originate from arteriosclerosis. It has also been described as a manifestation of generalized thromboangiitis obliterans.

The symptoms, according to Sugar, include premonitory headache, vertigo, hemiparesis, hemiparesthesia, and speech defects; temporary blindness is not infrequent. The pupil on the side of the blindness may be transiently miotic. Thrombosis of the central retinal artery leading to atrophy of the optic nerve may occur. Webster, Dolgoff, and Gurdjian described four methods of onset: (1) explosive, simulating stroke; (2) slowly progressive, characterized by remissions and recurrences (which may suggest multiple sclerosis); (3) with visual symptoms; (4) without signs or symptoms. Elvidge described recurring disturbances of a hemiplegic nature, resulting eventually in hemiplegia which is more or less complete. He also spoke of fatigability, headache, blurring of vision, and impairment of memory. Head noises and convulsions have been described by Shapiro and Peyton.

The site of thrombosis or embolism has been most commonly distal to the bifurcation of the common carotid artery. However, occlusions in or just above the siphon of the carotid artery and in other positions have been described.

The differential diagnosis is at times quite difficult, especially in those cases which have remissions and recurrences of symptoms. Multiple sclerosis is often considered as some of these patients develop nystagmus and interference with speech. The cardinal point is that the recurrence can always be referred to pathology in the same locus in the brain, whereas in multiple sclerosis, multiplicity as to location, as well as to time, is the rule. The original diagnosis in many of these cases has been brain tumor, intracerebral hemorrhage, brain abscess, or subdural hematoma.

Angiography is an essential feature of the diagnosis in these cases. In fact, without it one can seldom be sure unless an actual operation on the carotid artery is performed and the occlusion is demonstrated under direct vision. However, one must be careful not to make the diagnosis too readily, merely on the failure to visualize the dye in the vessel suspected. Aneurysms of the carotid artery, as well as other pathologic entities, are capable of blocking a portion of the internal carotid system in such a way as to produce a failure to fill. Shapiro and Peyton listed six characteristics of the angiogram suggesting internal carotid occlusion, the first four of which are strong evidence: (1) a conical narrowing of the dye, resulting in visualization of a stump or a short segment of the internal carotid artery; (2) failure to fill the internal carotid artery and a defect in the column of the dye; (3) retrograde flow of the dye into the common carotid artery and on the right side through the innominate to the vertebral artery; (4) irregularities in diameter of the vessel and narrowing of the vessel; (5) failure, on repeated attempts, to produce any filling of the internal carotid; and (6) failure, on repeated attempts, to produce any filling beyond the carotid siphon.

In addition, the authors observed that the diagnosis is most certain when the internal carotid system on the suspected side fails to fill with repeated attempts, while angiography on the good side fills both internal carotid trees across the circle of Willis. Angiography on the unaffected side, however, carries a definite risk of embarrassing the remaining circulation.

Another excellent suggestion as to detection has been offered by Dunning. He suggested that palpation of the artery in the pharynx will demonstrate absence of pulsation of the internal carotid on the affected side.

While some of these patients have appeared to recover spontaneously, the problem of therapy is still difficult and awaits development. Removal of the thrombosed artery with denervation of the carotid sinus has been suggested; ligation of the external carotid and common carotid artery has also been offered; stellate blocks have been suggested, but many have found them to be of no benefit. Shapiro and Peyton recommended arteriectomy, cervical sympathectomy, and anticoagulant therapy. All workers agree, however, that diagnosis and therapy are of the utmost urgency in these cases because no benefit can be expected unless the treatment is started immediately. Of all the various suggestions, anticoagulant therapy, promptly begun, appears to be the most efficacious. (Surgery, Nov., 1954; W.R. Chambers, M.D., Atlanta, Ga.)

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Delayed Union and Non-Union of Tibial Fractures

Fractures through the dense compact bone of the shaft of the tibia are predisposed to slow healing and non-union. While the over-all incidence of delayed union or non-union has been estimated at less than 3% for the skeleton as a whole, it has been reported in the tibia to be as high as 7% for selected non-comminuted fractures, 9% for unselected consecutive cases, and 75% for displaced compound fractures.

Delayed union is a term with arbitrary meaning applied in this article to un-united fractures in which (1) the x-ray examination at any time from 4 to 18 months of healing showed inadequate callus, and (2) the judgment of the individual surgeon led him to advise a surgical operation to stimulate healing of the fracture.

Non-union is a more specific term and it has been reserved for un-united fractures in which the roentgenographic examination after 18 months of healing showed (1) a bone defect, (2) false motion, (3) sclerosis of the bone ends, (4) rounding, mushrooming, or molding of the fracture surfaces, and (5) sealing of the medullary canal with compact bone to form functioning false joint surfaces and an apparent arrest of the process of osteogenesis in the fracture gap.

The healing time of fractures before and after surgical treatment for delayed union and non-union is summarized in 85 cases. The length of the segment of the shaft which had been damaged and which had to be repaired, and the amount of separation of the viable bone ends were always greater in an un-united fracture than in a matched control fracture of a similar type, with similar treatment and complications. A study of roentgenograms and biopsy specimens showed that the fracture underwent a healing process even if union failed to occur. Osteogenesis began, as always, in viable bone tissue at a distance from the fracture line, grew by extension toward the fracture site, but failed to bridge the gap in the same period of time as it did in control cases. Various circumstances which produced greater bone damage and defects than the body could repair in a prescribed period of time were (1) displacement, comminution, and missing substance, (2) surgical dissection of the fracture site, (3) exposed bone, (4) sepsis, and (5) metallic appliances.

Fracture healing is one of the body's reactions to injury which is just as active and complete in the highest mammals as it is in the lowest vertebrates. Non-union normally occurs and is not a pathological process in defects in the skull in adult persons. Non-union is always pathological in fractures of the long bones, if the bone ends are in contact and have been properly immobilized. Absolute immobilization is not necessary for the healing of fractures of the ribs, the upper portion of the humerus, or the pelvis where callus formation is normally exuberant. Immobilization is very important, however, for union to occur in the neck of the femur and the shaft of the tibia, where callus formation is normally scant.

Observations presented in this report suggest that fibrinoid degeneration of connective tissue is the universal mechanism of non-union. Fibrinoid is invariably found when there is non-union, regardless of the nature of the clinical circumstances or the treatment of the fracture. Fibrinoid might be interpreted as the by-product of inflammation or the result, -- not the cause--of non-union. It is consistent with the facts to assume, however, that fibrinoid degeneration is a dynamic process and not a static barrier. Actually, the quantity of fibrinoid at any one time is relatively slight, but fibrinoid degeneration of connective tissue in the interior of the callus is a continuous process. It occurs in the space ordinarily occupied by fibro-cartilaginous callus. The function of the fibrinoid and mucinous fluid, which form when the callus splits, appears to be to create and to preserve the false joint space. The origin of glycoprotein, hyaluronates, and other polysaccharides in pseudarthrosis fluid is not known, but they may be degradation products of ground substance and fibrinoid. The cellular and chemical changes concerned with these substances closely resemble those in chronic adventitious bursitis, except that they occur between the bone ends rather than in the subcutaneous area over a bony prominence. Even the etiological factors of these two conditions are the same; they arise with injury and necrosis of connective tissue. They are sustained

by inflammation, infection, motion, and friction, and result in an extracellular effusion of mucinous-tissue fluid. Furthermore, the process is inhibited and reversed by immobilization of the part. Recent additions to the knowledge of the histochemistry and histophysiology of connective tissue clearly indicate that continuous fibrinoid degeneration is an important basic concept in orthopaedic surgery. It is the essential process in the function of an arthroplasty, and is detrimental to achieving an arthrodesis.

Bone tissue is ever being turned over and bone tissue formed in callus is no exception. Fractures can appear never to stop healing. There is no definite time after which a pseudarthrosis cannot unite simply by prolonged immobilization. Experience has shown, however, that in old cases excisional surgery is more likely to produce union in a reasonable period of time. A new proliferative process begins after any surgical operation and after the implantation of any type of bone graft.

The effect of open operations on fresh fractures is to increase the volume of damaged bone which has to be absorbed and replaced before the fracture can unite and permit full weight-bearing on the leg. Comminuted fractures of the shaft of the human adult tibia should be considered non-operable fractures during the first six months of healing, because the trauma added by surgery exceeds the normal capacity for bone regeneration in this area of the skeleton.

Bone-grafting, without excision of the fibrocartilaginous callus, may be applied successfully in un-united fractures of the tibia before 18 months of healing. Excision of the pseudarthrosis, osteotomy of the fibula, and telescoping of the fracture ends are advisable in un-united fractures after 18 months. All of the standard surgical procedures of onlay, inlay, or intramedullary bone grafts are capable of producing union with the aid of one additional year of immobilization of the fracture, but the success of the operation is determined by the proliferative reaction of the bone ends, not the bone graft. If the bone ends are in close contact, the function of the graft appears to be that of an inductor. Recurrence of sepsis is the chief cause of failure of all types of bone-graft operations. Roentgenograms which show a diffuse increase in density of bone tissue three or four centimeters above and below the fracture line indicate latent sepsis. In such cases, 6 months, or even 2 years without drainage, is not a safe period of waiting to permit a bone-graft operation. Only synostosis operations which avoid the fracture site are free of risks of further damage to the bone ends by infection.

Radical leg-shortening procedures are an alternative to amputation and may be applicable in old un-united fractures with large soft-tissue defects after repeated failure of bone-grafting operations. (J. Bone & Joint Surg., Oct., 1954: M. R. Urist, M. D., R. Mazet, Jr., M. D., Los Angeles, Calif., and F. C. McLean, M. D., Chicago, Ill.)

Spontaneous Subarachnoid Hemorrhage

Non-traumatic bleeding into the subarachnoid space is now recognized as a clearly defined pathologic entity with a striking group of symptoms, almost unmistakable clinical picture, characteristic spinal fluid findings, and a decidedly guarded prognosis. Modern concept ascribes all such instances of massive effusion of blood into the subarachnoid space to rupture of "berry" or "miliary" aneurysms of the circle of Willis.

Slow oozing from an aneurysmal sac before rupture can occasionally be correlated with the clinical symptoms of severe headache, apprehension, vertigo, possibly nystagmus, stiff neck, nausea, and vomiting. These symptoms persist for as long as six days before actual rupture and their true significance is likely to be overlooked. The slow dissection undoubtedly accounts for the clinical observation that violent physical exertion with resultant increase in arterial tension is by no means a constant precipitating cause of rupture.

Spontaneous subarachnoid hemorrhage probably accounts for from 1 to 2% of all sudden or unexplained deaths. The bleeding takes place between the pia mater and arachnoid, almost always at the base of the brain.

There is scarcely a syndrome in the realm of medicine which is more dramatic in its onset and development than that of spontaneous subarachnoid hemorrhage. The signs and symptoms as set down by Barker are: (1)Sudden onset, often with a feeling as though something had snapped in the head, followed by severe occipital pain which later tends to become generalized; (2) nausea or vomiting almost immediately after onset; (3) within a few hours, marked rigidity of the muscles of the neck with positive Kernig and Brudzinski signs; (4) on cautious lumbar puncture, blood will be found evenly distributed throughout the fluid in each of three successive tubes.

By the end of 1 year approximately one-half of all patients with spontaneous subarachnoid hemorrhage will have died in either the primary attack or a recurrence while the remainder will have recovered. The findings of Magee are worth noting in this connection as he observed that 29% of the patients in his series died in the first attack while an additional 21% had succumbed to a recurrence by the end of 1 year.

The present study, although based on a small number of cases, appears to emphasize more than any other the extremely serious outcome in patients who have hypertensive cardiovascular disease. The gross mortality is slightly less than 50% for the entire group, and in the absence of HCVD there is at the moment an 80% survival in a period of time which extends from 1 to 10 years and averages about 5 years. Unquestionably some of these patients will have subsequent attacks as time goes on, particularly one with hypertension, but 80% is an unusually high rate of survival even for a 5-year average. (Am. J. Med., Oct., 1954; G. R. McCutchan, M. D., Portland, Ore.)

Emergency Patient Removal

One Nurse

1. Pack Strap Carry (from room). Pull patient to sitting position by grasping his right wrist with your right hand and his left wrist with your left hand. Turn under joined arms and place your back against his chest so that your shoulders are lower than his armpits. Pull his arms over your shoulders and across your chest for leverage, lean forward slightly and carry from room, never once letting go of your original wrist grip.

2. Hip Carry (from room). Sit on bed. Place your back against patient's abdomen. Grasp knees with one arm and slide your other arm down and across his back under free arm. Grip under armpit. Draw patient up on hips and carry.

3. Cradle Drop (to blanket). Get down on one knee facing bedside. Place other knee at right angles to patient's knees. Your knee must be absolutely straight out and touching bed. Grasp his knees with one arm, his neck and shoulders with the other. There is to be no lifting. Pull patient toward you and let him drop. Your knee will support his knees, and your arm will support his shoulders and head. The cradle formed by your knee and arm will protect his back. Ease to blanket, pull from room.

4. Kneel Drop (to blanket). Get down on both knees facing bedside. Grasp patient's knees with one arm, head and shoulders with the other. Do no lifting. Pull patient straight out from bed until he contacts your chest. Let him slide down your body to the cushion formed by your two knees. Ease to blanket. Pull from room.

Two Nurses

5. Extremity Carry (from room). First nurse works her hands under patient's armpits and grips her own wrists across his chest. Second nurse pulls patient's ankles out from bed, backs up between the knees and grasps both under her arms. Lift and carry from room. This has also been done off the floor and on the stairs.

6. Swing Carry (from room). Pull patient to sitting position. Both nurses pass an arm under his shoulders and across his back, and grip each other's wrist, one palm down, one palm up. Lift with arms and shoulders and carry from room. This has also been done off the floor and on the stairs.

7. Double Cradle (to blanket). Same as No. 3. Second nurse places knee closest to bed end at right angle with patient's shoulder blade.

8. Double Kneel (to blanket) Same as No. 4.

Three Nurses

9. Three Man Carry (from room). No. 1 grips just below and above patient's knees; No. 2 grips below and above the seat; No. 3 grips upper

back and shoulders. Pull patient to edge of bed, lift together and turn him so he is carried on your chests. Carry from room, feet first if possible. To set: all three drop to knee closest the feet and lower patient to floor.

10. Bed to Litter (right angle). Same as No. 9 but place on litter.

11. Bed to Stretcher (right angle). Same as No. 9 but place on stretcher.

12. Triple Kneel (to blanket). Same as Nos. 4 and 8.

Four Nurses

13. Floor to Litter (in corridor). Three nurses drop on knee closest to patient's feet. Same pick as No. 9 but fourth nurse kneels opposite middle nurse and also grips below and above seat. All come up together on command, turning patient over on chests of first three. No. 4 steps out and places litter for other three to set patient.

14. Floor to Stretcher (in corridor). Same as No. 13, but patient is lifted only knee high where he rests on knees of first three nurses, while No. 4 steps out and places stretcher so patient can be lowered. Two or four can carry. Use army type stretcher, poles in blanket, or blanket with edges rolled. Patient can be moved anywhere, even on stairs, fire escape, or elevators.

Six Nurses

15. For Broken Back, Neck, or Pelvis. Three nurses on each side of bed, or if on floor, kneel on knee closest to the feet. Two nurses at head form cup behind head of patient by lacing fingers of one hand each. Other ten hands are to be lined up alternately and worked in slowly toward the spine. All lift together on command and place on litter, stiff stretcher, or plywood on a blanket.

Wheel Chair

The best lift to load a wheel chair for speed is No. 6.

Drills

The best drills are combination patient removal and first-aid fire-fighting. Use three or four people in the primary movements and then have others join in. Using three beds the drills can be varied: like 3-6-9 or 4-5-10, or any other way. Horizontal and vertical evacuation is better understood by actual participation. Designating an underground air raid shelter now may save confusion at some later date. (Mod. Hosp., Nov., 1954; Lt. Robert McGrath, Fire Department, Chicago, Ill., from "Hospital Primary Emergency Defense.")

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A Silencer on the Siren

In mythology, the siren is associated with death and destruction. In modern civilization, the siren is a signal of a race against death (an ambulance) or destruction (a fire engine). But nowadays, the sirens are almost as dangerous as they were in the myths. They give the driver of the siren-equipped vehicle a sense of security, a false belief that everyone within earshot is going to do what they should and get out of his way. This doesn't happen. The result has been an unnecessary toll of traffic deaths and injuries.

Realizing this, sirens on ambulances have just been banned in New York City. Dr. B.C. MacLean, the Commissioner of Hospitals, calls the use of ambulance sirens "spectacular stupidity." He said, "A minute or two saved in transporting the patient to the hospital does not compensate for the risk of accidents caused by speeding ambulances." The flashing red light will be retained.

A pilot study in one of New York's five counties showed that, in ten months, the sirenless ambulance was involved in 60% fewer accidents. There were no untoward effects on the patients carried more slowly, and more safely.

It is appreciated that a hospital film is hardly worth the price of admission if it doesn't open with the keening of a siren as an ambulance rockets to the emergency room. Nonetheless, the siren may have to go in the interests of its sick passengers and of the citizenry as a whole. (Hospitals, Nov., 1954; Editorial Note)

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In Vitro Studies of Dental Decay

The concept of studying the carious process by using extracted human teeth under in vitro conditions was realized and applied early in the development of dental research. E. Magitot (1870) and W. D. Miller (1890) described carious lesions produced in this manner.

Recently the value of invitro studies has been increased by the development of the "artificial mouth." For this work, extracted human teeth are mounted singly or in pairs. The mounted teeth are placed in cylindrical funnels, and a bacteriological medium, "artificial saliva," is allowed to flow dropwise over the teeth for several months. At weekly intervals, the teeth are inoculated with pooled samples of human saliva and rapidly become covered with a mass of microorganisms.

Some of the most important factors that have been found to influence the destruction of the teeth are the following: Tooth destruction can be quite general if localizing factors are not present. If the teeth are cleansed regularly, destruction will be confined mainly to the noncleansed areas, to

previously abraded areas, and to the cervical areas. Old teeth appear to be more resistant than young or unerupted teeth, and there is evidence for the presence of a protective surface film. The attack is greatly influenced by the amount of D-glucose in the nutrient medium. With only a small amount present (0.10%), sound teeth remain unchanged for long periods. In the presence of a relatively large amount (for example, 0.5% D-glucose), enamel attack and decalcification of exposed dentin proceed rapidly. At intermediate concentrations (0.2 to 0.3%), both decalcification and dentinal matrix destruction occur, so that the entire tooth structure will be destroyed.

More recently, several additional important observations have been made: R. F. Sognnaes (Harvard School of Dental Medicine) has examined histologically thin sections from a number of teeth with localized lesions of enamel and of dentin, produced in the "artificial mouth." The sections were found to exhibit a number of features associated with natural lesions. According to Sognnaes, these are the following: (a) Accumulation of plaques containing gram-positive microorganisms has been demonstrated on tooth surfaces subjected to various bacterial substrates in the "artificial mouth." (b) The primary penetration of the enamel appeared to proceed between the prisms, accompanied by accentuation in the appearance of the prisms, the cross-striations, and the incremental lines, eventually followed by a loss of surface continuity. (c) Invasion of the dentin occurred along characteristic tracts, indicated by greater permeability to dyes and, eventually, followed by loss of tooth substance and cavity formation. (d) A predominance of gram-positive spheroid microorganisms could be demonstrated within distended dentinal tubules, eventually invading the ramifications of the tubules and destroying the inter-tubular matrix.

Several experiments have been concluded in which the attack was brought about by single strains of microorganisms. Under conditions such that both decalcification and dentinal matrix destruction would occur with mixed cultures, it was found after 3 months that an oral Lactobacillus casei strain produced decalcification but did not affect the matrix. On the other hand, an oral Streptococcus salivarius strain (found later to have become contaminated with a micrococcus) produced decalcification and matrix destruction. The partially attacked dentin was brown and leathery. These experiments are being repeated and extended to other microorganisms. In view of the usually accepted role of lactobacilli in the carious process, these results seem particularly interesting. (Science, 12 Nov., 1954; W. Pigman, D. D. S., Dental School and Medical College, University of Alabama, Birmingham)

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The printing of this publication has been approved by the Director of the Bureau of the Budget, June 23, 1952.

Reserve Retirement Point Credits

BuPers Instruction 1806.6 of 26 October 1954 establishes uniform policy within the Department of the Navy in regard to awarding retirement point credits under the provisions of Section 302b(2), Public Law 810, 80th Congress, for equivalent reserve instruction conducted contemporaneously with professional and/or trade conventions.

The Department of Defense has prescribed that equality shall be maintained among all the services in the granting of retirement point credits for equivalent reserve instruction conducted contemporaneously with professional and/or trade conventions and has authorized the granting of retirement point credits for certified participation when: (1) An individual participates in his capacity as a reservist and devotes his time and effort beyond that normally associated with his civilian occupation. (2) Such activity is engaged without remuneration other than pay to which he may be entitled as a member of a reserve component. (3) Such activity demonstrably improves the individual's fitness to perform the military duties to which he may reasonably be expected to be assigned upon mobilization or similarly improves the fitness of others by his supervisory responsibilities on such an occasion. (4) Such participation is effectively supervised by military personnel and the participation and activity have been previously approved by competent authority and are of such nature as to be susceptible of verification.

Activities within the Navy Department desiring to take advantage of a concentration of specialized reservists in attendance at a professional or trade convention, may with prior approval of the Chief of Naval Personnel conduct a training seminar for which reservists attending in accordance with appropriate duty orders may receive retirement point credits. The training seminar may be held in the same locality and on the same days scheduled by a convention but it must be separate from the convention program. (i.e., Sessions included on the convention agenda may not be scheduled as a part of the training seminar which will count for retirement point credit.) (ResDiv, BuMed)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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From the Note Book

1. Rear Admiral Lamont Pugh, MC USN, Surgeon General of the Navy, returned to Washington, November 15, 1954, from Luxembourg, where he represented the United States at the 14th International Congress of Military Medicine and Pharmacy. (TIO, BuMed)

2. Rear Admiral B. W. Hogan, MC USN, Deputy and Assistant Chief, Bureau of Medicine and Surgery, represented the Navy in the House of Delegates of the American Medical Association at the AMA Clinical Meeting held in Miami, Nov 29 - Dec 2, 1954. (TIO, BuMed)

3. Representatives from the Bureau of Medicine and Surgery, headed by Rear Admiral B. W. Hogan MC USN, Deputy and Assistant Chief of the Bureau of Medicine and Surgery, visited LOBUND Institute, Notre Dame University, November 18, 1954, by invitation from the Office of Naval Research.

LOBUND is the abbreviation for the Laboratories of Bacteriology, University of Notre Dame. The Institute is unique in that it is the only place in the world where germ-free laboratory animals have been raised. The utilization of these animals for solving problems of infectious disease, immunity, physiology, and nutrition has been described as "an extension of the pure culture technique wherein the whole animal is the test tube."

4. Dr. Howard T. Karsner, Research Advisor to the Surgeon General of the Navy, addressed the staff of Crile Veterans Hospital at Cleveland, November 23, 1954. (TIO, BuMed)

5. Thirty-six hospital executives, representing the principal Federal medical care programs, attended the Ninth Interagency Institute for Federal Hospital Administrators, November 1 - 19, 1954, at Walter Reed Army Medical Center (PHS, H. E. W.)

6. The transfer of Naval Reserve dental officers to the Regular Navy under the "Regular Navy Augmentation Program" is scheduled to be terminated on July 1, 1955, when Public Law 549, 83rd Congress, expires. The latest policies governing transfer under this program are contained in BuPers Instruction 1120.120 of 21 October 1954. (TIO, BuMed)

7. Because obtaining Senate confirmation for U. S. Navy appointments and the National Agency check for security clearance requires from three to four months, the dates of application for the Dental Intern Training Program and the Senior Dental Student Program have been advanced. Recruiting Service Note No. 196-54 of October 18, 1954, requires that applications for the Intern Program must be received in the Bureau of

Naval Personnel by January 15, 1955. Applications for the Senior Dental Student Program must be received in the Bureau of Naval Personnel by February 1, 1955. Because of the planned over-all reduction in the strength of the Navy and Marine Corps, it is probable that the number of billets for the Senior Dental Student Program will be reduced to forty. It is planned to retain eighteen billets in the Intern Program. TIO, BuMed)

8. Dr. G. J. Casey, Secretary of the Council on Hospital Dental Service of the American Dental Association, has recently informed Rear Admiral D. W. Ryan, DC USN, Assistant Chief for Dentistry and Chief, Dental Division, that the dental services of eighteen naval hospitals have been approved by the Council. (TIO, BuMed)

9. Secretary of Commerce Sinclair Weeks has announced that, at the direction of the President on the recommendation of the National Security Council, he is setting up an Office of Strategic Information in the Department of Commerce. This office will provide a central location within the Government which will work with the business community in voluntary efforts to prevent unclassified strategic data from being made available to those foreign nations which might use such data in a manner harmful to the defense interests of the United States. (Department of Commerce)

10. The motion picture, "Hazards of Dental Radiography," produced in 1953 by the National Bureau of Standards and the American Dental Association, has been awarded second prize in the Medical Category at the XV International Edinburgh Film Festival at Edinburgh, Scotland, August 22-September 12, 1954. (National Bureau of Standards)

11. A rapid, precise method for determination of carbon 14 in C^{14}-labeled substances has been developed by A. Schwebel, H. S. Isbell, and J. D. Moyer of the National Bureau of Standards. In this method the labeled material is first dissolved in a suitable solvent and then placed in a modified proportional counter which measures the radioactivity of the material. By keeping the specimen in solution, many of the problems inherent in the use of solid specimens--deposition of films, combustion, or plating of samples--are avoided. The procedure also permits the application of volumetric techniques and is particularly useful for the assay of highly active materials. (NBS, Summary Technical Report 1890)

12. The early management of maxillofacial war injuries, incurred by 200 patients, is discussed in the Journal of Oral Surgery, Oct., 1954; B. W. Kwapis.

13. A systemic representation of the research and developmental activities employed at the Amputation Center U. S. N. H., Oakland., in the origination, production, and evaluation of a type of laminated plastic skin for artificial legs, is reported in Research Project NM 007 084. 10, Sept 1954.

14. A thorough study of 10 cases, in which acrylic or nylon prostheses of the Judet type had been used, is discussed with emphasis on the inadequacies of the materials only. Each of these cases presented a definite failure of materials and required secondary operation. The failure of the materials was indicated by fracture, deterioration from friction, erosion of the prosthesis by body fluids, or by an unfavorable soft-tissue reaction. (J. Bone & Joint Surg., Oct., 1954; C. V. Heck, M. D., and F. A. Chandler, M. D.)

15. The results following the use of tracheotomy in the management of 40 patients with severe crushing injuries of the chest are reported and the experience of 10 thoracic surgeons with the procedure is outlined. The data indicates that tracheotomy is a useful and often a life-saving measure. (Arch. Surg., Oct., 1954; B. N. Carter, M. D., and J. Giuseffi, M. D.)

16. At the present time exchange transfusion is generally accepted as the most satisfactory treatment of erythroblastosis fetalis. While there is some difference of opinion regarding the rationale of exchange transfusion, there is unaninimity concerning its efficiency and effectiveness. (J. Pediat., Nov., 1954; A. S. Wiener, M. D., I. B. Wexler, M. D., and G. J. Brancato, M. D.)

17. A study of 103 carcinomas of the extra-hepatic biliary tract and the influence of a policy of radical resection on the prognosis are presented in Surg. Gynec. & Obst., Nov., 1954; F. Glenn, M. D., and D. M. Hays, M. D.

18. Protection from noise produced by aircraft, by power plants, by support facilities and equipment, is discussed in Archives of Industrial Hygiene, Oct., 1954; Major H. O. Parrack, USAF)

19. In disease of the pleura of unproved etiology, histopathologic and bacteriologic examination of biopsied tissue from the parietal pleura disclosed the presence of tuberculosis, mycosis, and carcinoma. (Dis. Chest, Nov., 1954; W. D. Sutliff, M. D., F. Hughes, M. D., and M. L. Rice, M. D.)

20. In 104 patients having Trichomona Vaginitis, the treatment used was various forms of caprylic acid. Ninety-two were clinically cured and free from the organism as determined by hanging drop examinations. (GP, Nov., 1954; W. J. Reich, M. D., M. J. Nechtow, M. D., N. Subotnik, M. D., A. Kurzon, M. D., and J. B. Reich, M. D.)

21. Twenty-four causes of fire in hospitals, covering 703,000 fires and representing a loss of $793,500,000.00, are discussed in Southern Hospitals, Oct., 1954; E. W. Fair)

Mutual Aid Policy

The Board of Directors of the Navy Mutual Aid Association on 19 November 1954 voted to pay a $500 terminal dividend to the designated beneficiary of any member whose death shall occur after 1200 E. S. T. on that date. This dividend payment is in addition to the regular benefit of $7500 and is payable in cash or as an annuity on a member's death. Paid-up memberships of less than $7500, terminated by death, will be increased by 6-2/3%. This dividend does not increase loan or surrender values of memberships.

This $500 dividend marks the first step in a long range policy to devote a part of the future earnings of the Association to increase the benefit after making ample provisions for surplus and contingency reserves. The Association has recently completed strengthening its reserves to a conservative 2-3/4% basis and is in excellent financial condition. This action by the Directors was based on the recommendations of two independent actuaries who have just completed a comprehensive survey of the Association's operations. Future dividends will be determined annually by the Board of Directors.

Officers wishing additional information should address their inquiries to the Navy Mutual Aid Association, Navy Department, Washington 25, D. C.

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Board Certifications

American Board of Anesthesiology
LT Irving G. Weinberg (MC) USNR

Americal Board of Internal Medicine
LT George J. Rhodes (MC) USNR
LT Daniel M. Wilkins (MC) USNR

American Board of Preventive Medicine
CDR Clark P. Jeffers (MC) USN

American Board of Radiology
LT Marvin F. Loring (MC) USNR

American Board of Surgery
LT John F. Curran, Jr. (MC) USNR
LT Frank R. Johnson (MC) USN
LT Glenn A. Young (MC) USNR

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Recent Research Reports

Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Booster Effect of Irradiated or Formolized Newcastle Disease Virus upon the Infectivity of Active Virus in the Presence of Chicken Blood. NM 005 048.11. 06, 23 Apr 1954.
2. The Immune-Adherence Phenomenon, an Immunologically Specific Reaction between Microorganisms and Erythrocytes, Leading to Enhanced Phagocytosis. NM 005 048.17.01, 7 May 1954.
3. Effect of Age and Sex Ratio on the Mating Activity of Anopheles Quadrimaculatus Say. NM 004 048.06.06, 22 June 1954.
4. On the Mg (II) Activation of Acetyl Cholinesterase. NM 000 018,06.32, 26 June 1954.
5. On the Theory of the Donnan Membrane Equilibrium. NM 000 018.06.35, 29 June 1954.
6. Measurement of High Frequency Sound Velocity in Mammalian Soft Tissues. NM 004 005.03.07, 30 June 1954.
7. Summaries of Research - 1 January - 30 June 1954.
8. High Noise Cable as a Sensing Device. NM 000 018.07, Memo Report 54-6, 2 July 1954.
9. Kinetics of the Pre-Steady State System of Catalase with Hydrogen Peroxide. NM 000 018. 07, 13 July 1953. Memo Report 53-10.
10. Membrane Potentials of the Squid Giant Axon in Vivo. Memo Report 54-7, related to NM 000 018.03, 21 July 1954.
11. Nature of the Acetyl Cholinesterase Surface. III Enzymatic Response to Cis-Trans Isomers in the Cyclohexane Series as Mapping Agents. NM 000 018. 06.36, 28 July 1954.
12. Lucite Calvarium for Direct Observation of the Brain in Monkeys. Lecture and Review Series, No. 54-3, 3 Aug 1954.
13. The Ectopic Development of Malarial Oocysts. NM 005 048.20.02, 6 Aug 1954.
14. Experiments with Chick Embryo-Adapted Foot-and-Mouth Disease Virus and a Method for the Rapid Adaptation. NM 000 018. 07, Memo Report 53-15, 11 Aug 1954.
15. Analysis of the Effects of Total-Body X-Irradiation on the Body Weight of White Swiss Mice. NM 006 012. 04. 67, 14 Aug 1954.
16. Blood Sulfhydryl Content in Rats and Guinea Pigs Treated with Cortisone or Adrenocorticotropin. NM 007 081.11.07, 17 Aug 1954.

Naval Medical Research Unit No. 3, Cairo, Egypt

1. On a Collection of Mammals from Northern Sinai. NM 005 050.39.35.
2. Scleroma in Egypt. NM 007 082.22. 01.
3. Studies in Shigellosis. I General Considerations, Locale of Studies, and Methods. NM 005 083.07.04.
4. Studies in Shigellosis. II Observations on Incidence and Etiology of Diarrheal Disease in Egyptian Village Children. NM 005 083. 07. 05.

5. Studies in Shigellosis. III A Controlled Evaluation of a Monovalent Shigella Vaccine in a Highly Endemic Environment. NM 005 083. 01. 01.
6. Studies in Shigellosis. IV A Controlled Trial of Sulfadiazine, Dihydrostreptomycin and Oxytetracycline as Long Term Prophylaxis Agents in a Highly Endemic Environment for Shigellosis. NM 005 083. 04. 01.
7. New Mammal Records from the Western Desert of Egypt. NM 005 050. 39. 37.
8. Identity of Ornithodoros Savignyi and O. Pavimentosus Neumann, 1901 (Ixodoidea, Argasidae) NM 005 050. 29. 12.
9. Two New Fleas of the Genus Araeopsylla Jordan and Rothschild. NM 005 050. 29. 05. 1.
10. Influence of Exposure to Various Carbon Dioxide Concentrations on Flicker Fusion Frequency and Alpha Blocking. NM 002 015. 11. 04, 27 Aug 1954.
11. Cursory Survey of the Intestinal Parasites of Natives Living in Southwest Anglo-Egyptian Sudan. NM 005 050. 01. 07.

Naval Air Development Center, Johnsville, Pa.

1. Viscoelastic Behavior of Isolated Aortic Strips Studied by Means of a Parallel Spring and Dashpot Analogue. NM 001 090. 02. 01, 12 Oct 1954

Medical Research Laboratory, Submarine Base, New London, Conn.

1. Effect of Time in Submarine Service on Vision. NM 003 041. 57. 03, 30 Aug 1954.
2. Photometric Survey of Seven Submarine Radio Rooms. NM 002 014. 08. 08, 19 Oct 1954.

Naval School of Aviation Medicine, NAS, Pensacola, Fla.

1. Automatic-Recording Visual Adaptometer NM. 001 059. 30. 01. 04, (Reprint of the Journal of the Optical Society of America, Vol. 44, No. 4, April 1954)

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ALNAV 58

Production difficulties preclude delivery influenza vaccine in time for all to comply with 15 November deadline. Deadline extended if vaccine not received. Administration to be completed as expeditiously as possible after receipt. Deliveries should be completed by 20 December.

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BUMED INSTRUCTION 7303.7A 2 November 1954

From: Chief, Bureau of Medicine and Surgery
To: All Activities Under Management Control of the Bureau of Medicine and Surgery

Subj: Report of Specific Work Requests (Reports Control Symbol Med-7303-1)

Ref: (a) NAVCOMPT Manual, Vol 2, Chapters 2 and 3
(b) NAVCOMPT Manual, Vol 3, Chapter 2
(c) BUMEDINST 4700.1B

Encl: (1) Format for report of specific work requests

This instruction is issued to revise the requirements covering the submission of financial reports on funds allotted for specific work requests under the appropriations Medical Care, Navy and Research and Development, Navy (Medicine). BuMed Instruction 7303.7 is canceled.

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BUMED NOTICE 5217 3 November 1954

From: Chief, Bureau of Medicine and Surgery
To: Activities under Management Control of BuMed, Continental and Hawaii

Subj: BuMed Instruction 5217.1 CH1 (Typewriters; utilization, replacement, disposal and purchase)

Encl: (1) Subject change

This Notice provides a replacement for enclosure (1) of BuMed Instruction 5217.1

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BUMED INSTRUCTION 1520.2B 10 November 1954

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations Having Dental Corps Personnel Regularly Assigned

Subj: Graduate and postgraduate training for officers of Naval Dental Corps

Ref: (a) Article 6-82, ManMed Dept

This Instruction informs all officers of the Dental Corps, U.S. Navy, concerning graduate and postgraduate training.

BuMed Instruction 1520.2A of 17 December 1953 is canceled.

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BUMED INSTRUCTION 6320.5C 17 November 1954

From: Chief, Bureau of Medicine and Surgery
To: All Naval Hospitals

Subj: Naval hospitals designated to receive patients who require special treatment

Ref: (a) Article 11-30(2), Manual of the Medical Department

This Instruction designates certain naval hospitals to receive patients who require definitive treatment and specialized medical care. The designations are in accordance with missions to be incorporated in Tentative Basic Naval Establishment Plan, Fiscal Year 1956.

BuMed Instruction 6320.5B is canceled.

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BUMED INSTRUCTION 11010.1 23 November 1954

From: Chief, Bureau of Medicine and Surgery
To: All Activities Under Management Control of the Bureau of Medicine and Surgery

Subj: Annual Station Development Board Program; submission of

Ref: (a) OPNAVINST 11010.2A of 19 Oct 1954
(b) SECNAVINST 11010.2 of 22 Oct 1954

The purpose of this instruction is to provide guidance for commanding officers in the implementation of instructions contained in references (a) and (b).

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BUMED NOTICE 6710 26 November 1954

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Antibiotics; extension of potency dates

Ref: (a) Medical and Dental Materiel Bulletin (MDMB), Edition No. 48 of 1 November 1954

This Notice provides authority to extend the potency dates of certain antibiotics.

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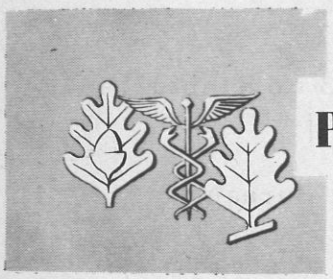

PREVENTIVE MEDICINE SECTION

Communicable Disease Control

Viral Hepatitis

Pertinent portions of Air Force Pamphlet No. 160-5-6 concerning viral hepatitis are being reproduced as of general interest to personnel of the Navy.

Significance of Disease. Viral hepatitis is recognized as a disease of considerable military significance. Over 185,000 cases occurred in the Armed Forces of the United States alone during World War II. A review

of statistics for hospital admissions of Air Force personnel reveals that this disease accounts for approximately 2000 admissions annually. When it is considered that each case loses an average of 45 days from duty, the impact of viral hepatitis on overall Air Force operations can be readily appreciated.

Definition:

a. At present, two main divisions of viral hepatitis are recognized on the basis of their modes of transmission. One is the naturally occurring infection transmitted for most part by the oral intestinal route. The other type is transmitted by the parenteral injection of materials, such as blood, plasma, or serum, containing the icterogenic agent. This latter form of the disease is termed "homologous serum jaundice."

b. The term "viral hepatitis" has been proposed for those forms of hepatitis which are caused by filterable, infectious agents which produce, as their outstanding clinical manifestation, evidences of liver damage. Viral hepatitis thus includes both infectious hepatitis (catarrhal jaundice) and homologous serum hepatitis.

Etiology.

a. Viruses A and B. The term "virus A" refers to those strains of the virus which are associated with outbreaks of naturally occurring infectious hepatitis. "Virus B" represents the agent which, if present in human blood when inoculated parenterally, will produce hepatitis, usually after a period of 60 to 160 days. The most distinct difference between the two viruses is that virus A has been found in the feces in the acute phase of the disease, whereas virus B has not. Both viruses have been found in the blood during the acute phase of the disease. Virus A has been isolated from the blood of a patient as early as 3 days before onset of symptoms. Virus B has been isolated from the blood of patients early, midway, and late in the incubation period, the longest known period before onset of jaundice being 87 days. Virus A has not so far been demonstrated in the blood after the acute state of the disease. Virus B. However, has been shown to be present in the blood for at least 5 years after its first detection in an individual with hepatic cirrhosis.

b. Survival of Virus. There is no evidence to indicate that any of the commonly employed antiseptics, such as alcohol, ether, or zephiran, inactivate virus A or virus B. Virus A (in serum or feces) survives heating to 56°C for 30 minutes and remains active when frozen 1 to 1 - 1/2 years at 10° to 20°C. It may withstand chlorination in water (1 p. p. m.) for 30 minutes, although this amount of chlorine was effective when the organic material in the water had undergone previous coagulation and settling. Virus B, in serum, survives heating to 60° C for 1 hour. It remains active at a temperature of 10° to 20°C for 4 - 1/2 years, and will remain active in a desiccated state, at room temperature for at least a year. Earlier experimental studies suggested that virus B was destroyed in plasma by ultra-violet irradiation, but subsequent investigations have

indicated that this is not always true and multiple cases of hepatitis have been reported following the injection of a single pool of irradiated plasma.

Modes of Transmission.

a. For Virus A. Complete knowledge of the natural mode of spread of infectious hepatitis is not available because of the lack of an experimental host other than man. However, numerous observations and reports which have been made over a period of years in different parts of the world suggest that the fecaloral route has been the important method of spread of virus A. Contact infection appears to be the commonest way of transmission, although a number of examples of apparent food-borne and water-borne outbreaks in temperate climates have also been described. The frequent demonstration of the presence of virus A in the stools of patients in the acute stage of infectious hepatitis indicates how easily finger, food, and fomites could be contaminated with virus A and mechanically transmitted to man. In some countries, particularly in temperate climates, some observers believe that infectious hepatitis has been spread by droplet infection. Since virus A is present in the blood stream during the acute stage of the disease, it may also be spread by inoculation of blood or tissue fluid during prophylactic or therapeutic procedures such as parenteral injections, transfusions, and venipunctures.

b. For Virus B. Virus B has not been found in the stools or nasopharyngeal secretions although some observations have been made which suggest that contact infection can occur. Parenteral penetration is the only method of spread of which there is unequivocal proof. Infection with virus B has occurred in individuals who have received blood or its products for prophylactic or therapeutic procedures, and in individuals undergoing injections for any cause (vaccines, antibiotics, insulin, et cetera) where the syringes and needles used for the injections are presumed to be contaminated with infected blood. It has occurred also in individuals who have only had blood removed for examination. In the latter instance, blood-contaminated syringes, needles, lancets, or other instruments have been the means of transfer. Localized outbreaks have been traced, in some instances to contaminated dental instruments.

c. Occupational Procedures. In addition, there are certain occupational procedures, such as the processing of blood in blood banks (transfusion centers) and the collection of blood for hospital laboratories, during which infection with virus A and virus B can occur. Various observers have reported a considerably higher incidence of this disease among doctors and nurses than in the population at large. The exact site of penetration is not usually determined in these cases but is presumably through skin abrasions or accidental needle pricks. It has been estimated that as many as 0.5% of donors may be carrying this virus in their blood. There is no satisfactory information on the transmission of the virus by blood-sucking insects.

Epidemiology.

a. Available reports indicate that both virus A and virus B are worldwide in distribution. There appears to be a seasonal variation with virus A, the incidence tending to increase in the fall and early winter in temperate climates. No seasonal variation has been noted with virus B. In the case of virus A, the incidence of the disease in exposed groups is much lower among those over 30 years of age. There is also considerable evidence that infectious hepatitis is a milder disease in childhood than in later years. On the other hand, there seems to be no decrease with age of susceptibility to virus B. Available data indicates that infection with either virus A or virus B confers homologous immunity to the same virus. However, no cross immunity between the two viruses has thus far been demonstrated.

Differential Diagnosis.

a. General. Diagnosis in the pre-icteric phase, or in patients with non-icteric hepatitis, must be made primarily on the basis of epidemiological and clinical data, because there is no specific diagnostic laboratory test for this disease. Tenderness to percussion over the liver, posterior cervical adenopathy, and splenomegaly are important early diagnostic signs. In the acute, pre-icteric phase, leukopenia and subsequent relative lymphocytosis with numerous large atypical lymphocytes are often found. The intradermal injection of 0.1 mg. of histamine or equivalent in 1 minim of solution may prove useful at times, the wheal becoming yellow within 30 to 60 seconds after the injection in cases of latent jaundice. A number of biochemical measurements are available which may indicate impaired liver physiology in a nonspecific manner. Despite the limitations and scope of these tests, their usefulness in the differential diagnosis and prognosis of viral hepatitis should not be minimized. To evaluate properly the functional capacity of the liver at any given time, it is recommended that a panel of tests be performed. Serial use of the same test at intervals throughout the course of the disease will also serve to increase the accuracy of interpretation.

b. Other Diseases to be Considered. During the febrile, pre-icteric phase, other diseases to be considered are: acute bacillary dysentery, typhoid or para-typhoid fever, malaria, sandfly fever, dengue, infectious mononucleosis, and in some cases, acute surgical abdomen. Following the onset of jaundice, conditions which should be considered are: acute and sub-acute cholangitis, Weil's disease, and yellow fever. Jaundice may also occur in a variety of other acute and chronic infections such as malaria, brucellosis, amebiasis, pneumonia, general septicemia, infectious mononucleosis, and syphilis. Other types of jaundice to be considered include: hemolytic, either congenital or acquired; hepatocellular, resulting from toxic chemicals of cirrhosis of the liver; and obstructive, due to extra or intrahepatic obstruction of the biliary tract.

Laboratory Diagnosis. The selection of a liver function test to be included in the panel of study in an individual case of viral hepatitis is dependent upon the availability of the test, the simplicity of technique involved, and the type of information supplied by the test. Based upon these criteria, the following tests have been found to be useful at periodic intervals in a case of viral hepatitis:

a. The serum bilirubin--1 minute and total. The clearance and excretion of bilirubin from the circulating blood is a function of the liver. The impairment of this function in cases of hepatitis with jaundice parallels roughly the degree of severity of the disease. The technique of serum bilirubin determination with the method of Ducci and Watson enables the partition of this pigment into the "1 minute" (prompt direct) and "total" fractions. The 1-minute fraction is interpreted as the bilirubin that has passed from the hepatic sinusoid through the liver cell and has regurgitated back into the blood stream because of pathology distal to the liver cell. The difference between the 1-minute fraction and the total serum bilirubin is thought to measure the pigment not removed from the hepatic sinusoids. This fractional serum bilirubin determination is particularly valuable in the patient with hepatitis but no clinical jaundice. While the total serum bilirubin may be within normal limits in such cases, there is often an elevation of the prompt reacting fraction. A substantial elevation of the total, on the other hand, with very little or no elevation of the 1-minute serum bilirubin, would point more to a hemolytic type of jaundice.

b. The urine bilirubin. In patients with hepatitis, bilirubin is commonly noted in the urine 1 to 3 days prior to the onset of clinical jaundice. The amount of bilirubin present in the urine seems to correlate roughly with the degree of elevation of the 1-minute fraction of serum bilirubin. There appears to be a changing renal threshold for bilirubin depending upon the duration of hepatitis. Early in the course, bilirubin may be noted in the urine when the 1-minute fraction is only slightly elevated. After 2 to 4 weeks of disease, however, it is not uncommon to note no bilirubinuria even with moderate elevations of the 1-minute fraction. Because the prompt reacting bilirubin may be elevated with a normal total serum bilirubin (see "a" above), it follows that bilirubinuria may occur with no clinical jaundice. Because of its simplicity, the test for bilirubin in the urine can be carried out at the bedside and is useful as a screening test for hepatitis.

c. Urine and urobilinogen. Bilirubin is converted in the intestine urobilinogen, a portion of which reaches the liver through the portal circulation. Normally, most of this chromogen is handled by the liver cell and very little is excreted in the urine. Thus an abnormal amount of urobilinogen in the urine is dependent upon the simultaneous presence of bilirubin in the intestine and liver cell damage. This combination occurs

in the prodromal phase of hepatitis and in the phase of remission of jaundice. A simple test for urine urobilinogen is available which can be used at the bedside. It is valuable as an aid in the diagnosis of hepatitis in the pre-icteric phase of the disease and is a sensitive indicator of liver dysfunction in the later stages. This test, too, lends itself to mass usage for screening purposes.

d. Cephalin cholesterol flocculation and thymol turbidity. Abnormalities of the serum proteins in hepatitis are believed to be responsible for the positive results with the flocculation and turbidity tests. These abnormalities apparently result from liver cell damage; when positive, they indicate, in a high percentage of cases, hepatogenous rather than extra-hepatic jaundice. The tests, therefore, find their greatest use in the differential diagnosis of jaundice. They are also useful for prognostic purposes since their degree of positivity follows roughly the clinical course of the disease. False positives, particularly with the cephalin cholesterol flocculation, are not uncommon; one should, therefore, be cautious in diagnosing viral hepatitis from this type of test alone.

e. Bromsulfalein. The clearance of bromsulfalein dye from the circulating blood is a reliable test of hepatic function. It finds its greatest application in the patient without jaundice who is suspected of having liver diseases. It becomes positive early in the course of hepatitis and will remain so until the late stages of convalescence. Though it may be negative, even in the presence of histological damage, there is an extremely high degree of correlation between the bromsulfalein test, when positive, and microscopic pathology of the liver. Because of the similarities in the physiology of excretion of bromsulfalein dye and bilirubin from the circulating blood, this test correlates closely but not completely with abnormalities of serum bilirubin in hepatitis. When using the 5 mg. per kilo modification of this test, greater than 4% retention at the end of 45 minutes is considered abnormal.

Treatment.

There is at present no specific antibiotic or chemo-therapeutic agent available for the management of uncomplicated viral hepatitis. Treatment consists of the judicial use of bed rest, diet, and the avoidance of exposure to hepatotoxins. This should be coupled with careful observation and evaluation of the hepatic status in all stages of convalescence.

a. Rest.

(1) Based upon the fundamental observation that physical activity during the early phases of hepatitis leads to a recrudescence of the disease or a prolongation of the clinical course, it is the current belief that bed rest is the first essential in treatment of the disease. Because the patient usually has such a marked degree of malaise in the first week or two of illness, there is no difficulty in maintaining bed rest during this period. It is when the initial stormy phase has passed, and a feeling of

well-being returns, that it becomes difficult to convince the patient that a further interval of rest in bed is required. However, serial liver biopsies taken in the convalescent phases of hepatitis have clearly demonstrated that, even in the mildest of clinical cases, evidences of inflammation may remain in the liver for as long as 3 months from the onset of the disease. This fact supports the concept that the period of bed rest should be enforced for all patients with viral hepatitis from the time of diagnosis until the principal manifestations of the disease have disappeared. In no case should ambulation begin until the total serum bilirubin has dropped below 1.0 mg. (icteric index 10), the bilirubin has completely disappeared from the urine, and the liver is completely non-tender to palpation. In all cases, it is recommended that patients receive a minimum of 4 weeks' bed rest.

(2) When these criteria have been satisfied, the patient should gradually be ambulated. It is advised that the return to full activity be spread over 4 weeks--longer if necessary. The patient should be seen and examined frequently during this convalescence and a return of gastrointestinal symptoms, hepatic tenderness, bilirubinuria, or bilirubinemia should be carefully watched for. Reappearance of the above signs or symptoms heralds a relapse and indicates that further treatment is necessary.

(3) It is recommended that, before the patient leaves medical observation, he be given a trial of full activity or even enforced activity. If in these circumstances none of the signs or symptoms characteristic of a relapse become evident, the physician may feel reasonably certain that no further hepatic difficulty will ensue.

(4) It is recognized that strict adherence to the above program may at times be difficult, but experience has shown that conservative management without haste produces the best therapeutic results.

b. Diet.

(1) Though animal experiments suggest that certain dietary supplements such as choline or methionine may have a protective influence upon the liver, there is no clinical evidence available supporting the use of any dietary adjuvants as specific in the treatment of viral hepatitis. In general, a well-balanced diet with not less than 120 gm. of protein and a caloric content of 3000 to 3500 should be used. No evidence that dietary fat has a deleterious effect upon liver in hepatitis has been brought forth. Consequently, a low fat diet is not recommended unless the patient is unable to tolerate fat in his diet. With such individuals dairy fats are usually better tolerated than meat fats. Multivitamins are given on an empiric basis.

(2) Since anorexia, in the early states of hepatitis, may prevent an adequate caloric intake, multiple small feedings are often helpful in maintaining oral intake. Every effort should be made to prepare meals attractive in appearance and taste. It is important to observe what foods are actually eaten by the patients and to vary the individual diets accordingly. Weight gain should be encouraged in convalescence.

(3) When there is severe nausea and vomiting, parenteral feedings are mandatory to maintain fluid and electrolyte balance and to insure at least a minimum intake of calories. Glucose, saline, and amino acid mixtures, along with blood and plasma, have been found to be useful in these circumstances.

(4) Parenteral Vitamin K should be administered to patients with a prothrombin deficit. Poor response indicates a grave prognosis. Surgery, anesthesia, barbiturates, and opiates should be avoided because they are poorly tolerated by the patient with hepatitis.

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Industrial Medicine

Duplicating Machines, Toxic Vapors

Attention of medical officers is called to the potential health hazards during the operation of duplicating machines.

Description of Equipment. There are several makes of spirit duplicating machines available, but they are all essentially alike. The material to be reproduced is drawn, typed, or written on a master "carbon" paper. The master sheet is then placed on a rotating drum in the machine. The copy sheet is fed between two rollers.

One roller is kept covered with a solvent (spirit fluid) fed to the roller by a felt pad from a reservoir. As the copy sheet passes between these rollers it is completely covered with solvent. The moistened copy sheet passes between another roller and the rotating drum and as it comes in contact with the reverse image on the master sheet it picks up a small amount of the concentrated dye. The final printed copy is a reproduction in purple or another color.

Duplicating Fluid. Spirit duplicating fluids are usually a mixture of ethanol, methanol, and cellosolve. The methanol content of the commercially used fluids varies from 40% to 100%. So far as is known, none of the commercial duplicating fluids are without methanol.

Results of Sampling. Samples of duplicating fluid were collected during runs of from 300 to 500 sheets on four different makes of duplicators in order to measure the methanol content. Ethanol and cellosolve contents were disregarded. Breathing zone concentrations of methanol ranged from 400 to 800 parts per million, and general room air concentrations were as high as 1000 p.p.m. Subsequent sampling at a battery of four machines, of which a maximum of three were in operation at any one time, showed methanol vapor concentrations ranging from 155 to 420 p.p.m. in the operators' breathing zones.

Toxicity of Methanol. In a review of 64 cases of industrial poisonings caused by vapor inhalation of methanol, 6 ended fatally, 19 suffered permanent blindness, and 33 had impaired vision. The American Standards Association has adopted 200 parts of methanol per million parts of air as the maximum allowable concentration for methanol on the basis of 8 hours of exposure per day for a worker.

Conclusions. The spirit duplicators should not be used in confined areas, such as small offices, without exhaust ventilation. Machines operated steadily in small rooms should be provided with an enclosing hood over the receiving basket, equipped with mechanical ventilation to give an air inflow of at least 100 linear feet per minute through the working openings of the hood. A canopy-type hood is suggested for the receiving tray, designed to completely enclose the tray except for the openings necessary to allow the paper to be fed into the tray and the finished work to be removed. An exhaust duct with a 2 - 1/2 inch diameter would suffice to carry the required air flow, and a small centrifugal-type fan would move the air in the volume desired satisfactorily.

Intermittent operation, with a total time of only 2 or 3 hours per day, would need no more than good general room ventilation. ("Exposure to Methanol from Spirit Duplicating Machines," R. G. McAllister, American Industrial Hygiene Association Quarterly, March 1954)

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